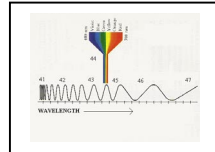


## Activity #4: Introduction to the Electromagnetic Spectrum-Teacher's Copy



### National Science Education Standards Addressed:

#### **TRANSFER OF ENERGY (Grades 5-8) Physical Science**

- Energy is a property of many substances and is associated with heat, light, electricity, mechanical motion, sound, nuclei, and the nature of a chemical. Energy is transferred in many ways.

#### **INTERACTIONS OF ENERGY AND MATTER (Grades 9-12) Physical Science**

- Waves, including sound and seismic waves, waves on water, and light waves, have energy and can transfer energy when they interact with matter.
- Electromagnetic waves result when a charged object is accelerated or decelerated. Electromagnetic waves include radio waves (the longest wavelength), microwaves, infrared radiation (radiant heat), visible light, ultraviolet radiation, x-rays, and gamma rays. The energy of electromagnetic waves is carried in packets whose magnitude is inversely proportional to the wavelength.

To the Teacher: The following URL (from a related NASA website) provides an excellent introduction to the topic of the electromagnetic spectrum. The accompanying worksheet can be completed by your students right at the classroom computers, if so equipped or, as an alternative, the teacher can download the exercise and make hardcopies to be used as the reference resource from which students can answer the worksheet questions.

Now having a good grasp on the similarities and differences of longitudinal and transverse waves from Activities #1-4, students will now begin to delve into the wavelengths of transverse waves from the long radio waves to the short gamma waves—the electromagnetic spectrum. Subsequent investigations will concentrate more specifically on visible and infrared wavelengths.

[http://imagine.gsfc.nasa.gov/docs/science/know\\_11/emspectrum.html](http://imagine.gsfc.nasa.gov/docs/science/know_11/emspectrum.html)

See “Activity #4: Introduction to the Electromagnetic Spectrum –Student’s Copy” and the accompanying ANSWER SHEET.

**Technology Integration:** The following websites provide enrichment activities and support materials for teaching the electromagnetic spectrum:

<http://www.physicsclassroom.com/Class/light/U12L2a.html> -The electromagnetic spectrum, color vision and visible light.

<http://observe.arc.nasa.gov/nasa/education/reference/emspec/emspectrum.html> - The electromagnetic spectrum

<http://observe.arc.nasa.gov/nasa/education/reference/emspec/cosmic.html> -Explains why cosmic rays are NOT part of the electromagnetic spectrum

<http://observe.arc.nasa.gov/nasa/education/gis/gis14.html> -Remote sensing equipment and the electromagnetic spectrum

<http://www.thursdaysclassroom.com/12jun01/teacher5.html> - Electromagnetic flash cards

<http://cbp-1.lbl.gov/cycle1p04b1.htm> -Shows the electromagnetic spectrum and everyday items that compare in size to the wavelengths of its various energies.

<http://quest.arc.nasa.gov/lfs/tguide/a1a.html> -The Electromagnetic Spectrum- Beyond the Visible

<http://www.gsfc.nasa.gov/astronet/spectrum.html> -The electromagnetic spectrum and the separation of white light into its component colors